

Turbocharger Installation

Procedures covered in this section:

Installation of turbocharger in the RotorWay A600 Helicopter.

Prints used in this section:

E48-2000 Turbocharger Installation

E48-2001 Turbocharger Oil Hose Routing

Notes:

1. Before installing the turbocharger, the engine must be rebuilt with connecting rods, pistons, rings and spark plugs that are specifically for the turbo. All are different from the standard parts.

The turbocharged engine uses a larger main drive pulley which reduces operating speed to 3900 RPM. Set the engine tach on the MGL so that 100 percent equals 3900 RPM.

A ring must be added around the intake opening of the plenum as a safety precaution. This makes a bead to prevent the silicone hose from coming off under pressure.

Rebuilding the engine is a service that can be performed by the factory. If you choose to rebuild the engine yourself, refer to the Engine Manual for detailed instructions.

2. The turbocharged engine requires re-programming of the ECUs. This can only be done by RotorWay.

All of these changes to the engine and ECUs have already been made if your helicopter was originally ordered from the factory with the turbocharger option.

3. Turbocharger installation on a previously built helicopter requires removal of the air filter, muffler and related components.
4. Weight and Balance must be re-calculated after installation of the turbocharger.
5. Before shutting engine off, make sure coolant and oil temperatures have cooled down. This will also give the turbocharger time to cool down.
6. The oil pump for the turbocharger must stay on for a minimum of 30 seconds after engine stops to prevent oil from backing up in the turbocharger. This is very important.

Diagram #1

Parts as received from RotorWay. Use prints E48-2000 and E48-2001 when installing the turbocharger.



Diagram #2

Assemble the turbocharger, turbo mount weldment and header to turbo weldment as shown. Make sure gasket is in place.

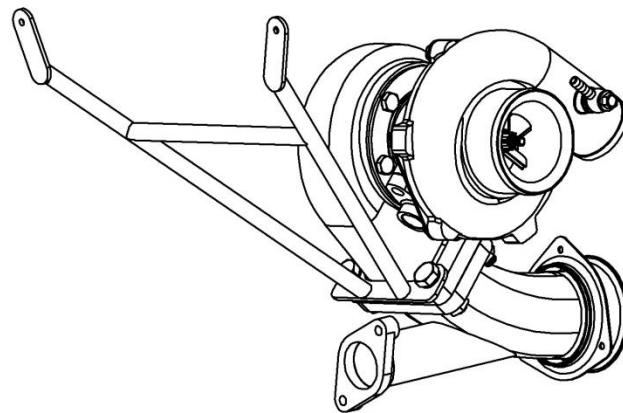
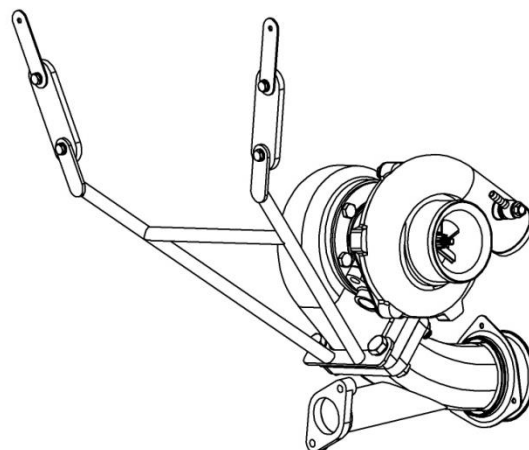


Diagram #3

Fabricate the rubber strips and steel mounting straps. Rubber strips should be about 4 inches long. Use fender washers on the nuts next to the rubber strips.

Note: A longer 3/16 bolt is used on the passenger side for mounting the intake tube. See next diagram.



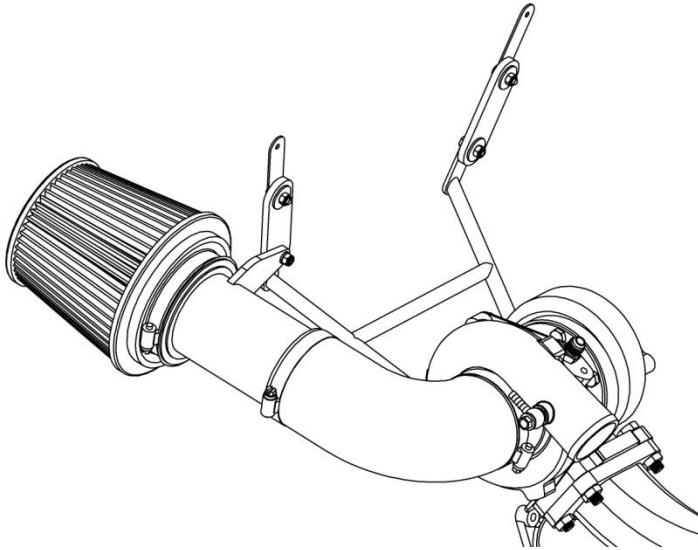


Diagram #4

Install the air filter, intake tube and 3" silicone elbow as shown, using the longer 3/16 bolt through the mounting tab on the intake tube.

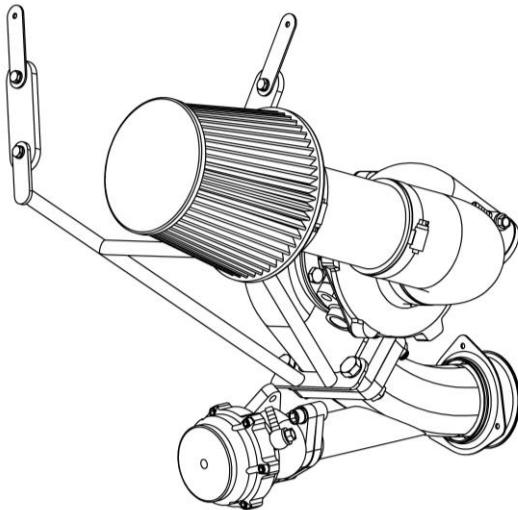


Diagram #5

Install the wastegate, making sure the valve seat and gasket are in place. There is a hole in the center of the wastegate, facing rear. Do not plug this hole, leave open.

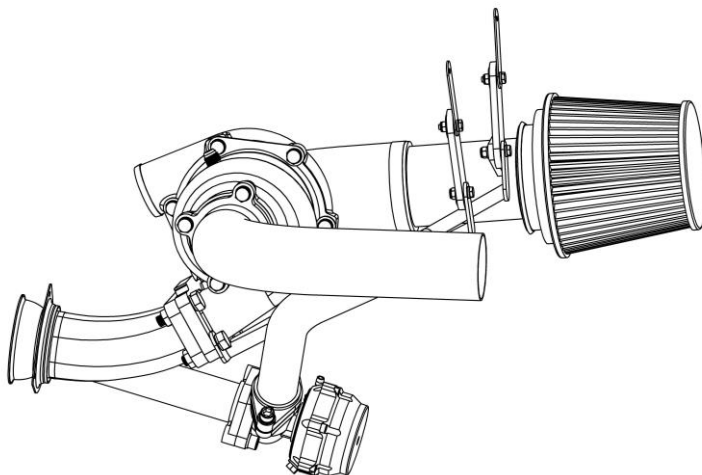


Diagram #6

Install the exhaust weldment on the turbocharger, matching the smaller tube to the flange on the wastegate. Make sure gaskets are in place.

Diagram #7

Route the silicone vacuum hose from the turbocharger to the wastegate. Secure each end with a hose clamp.

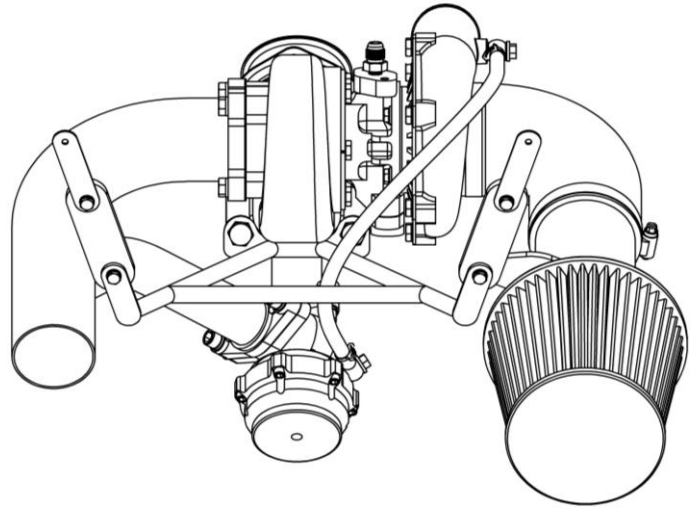


Diagram #8

Bolt the rear of the assembly to the mounting locations on the radiator.

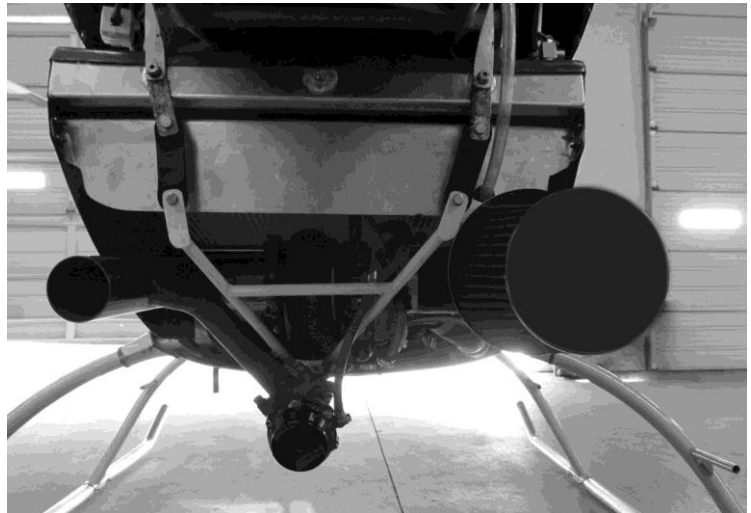
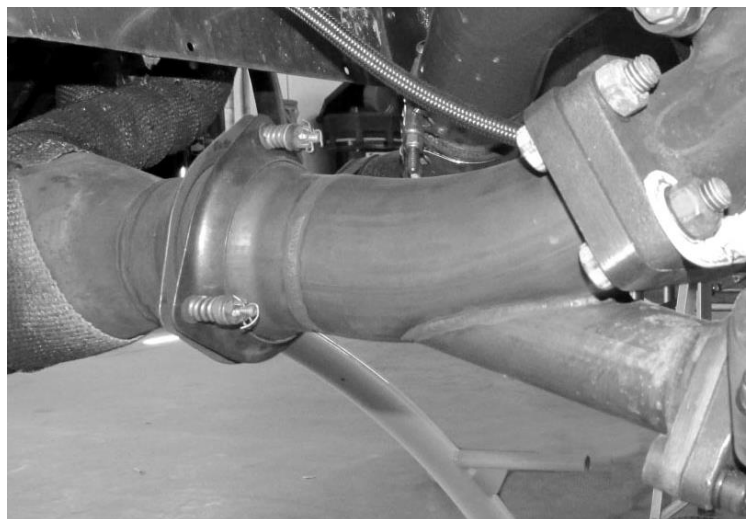


Diagram #9

Bolt the front of the assembly onto the ball end of the headers. Use cotter pins on the header bolts on final installation.



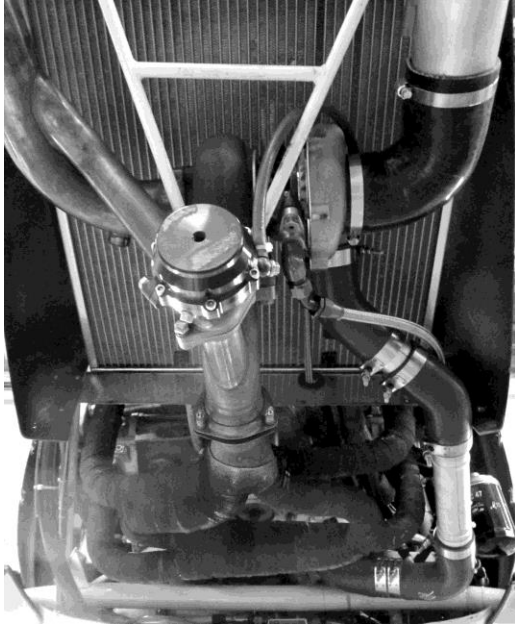


Diagram #10

Install the aluminum intake tubes and silicone elbows from the turbocharger to the engine as shown on print E48-2000.



Diagram #11

If not already present, install the plenum ring (indicated by arrow) on the intake of the plenum. Use 3M Scotchweld 2216 2-part epoxy adhesive to permanently bond the ring to the plenum. Clean off excess and allow the epoxy to dry according to product instructions. This ring will prevent the silicone hose from coming off under pressure.

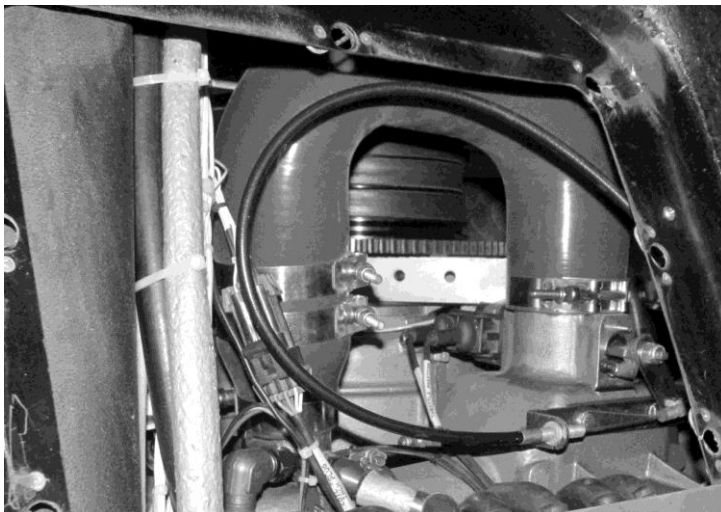


Diagram #12

Connect the 180 degree silicone elbow to the plenum, shown here with seat back panel removed on passenger side.

Diagram #13

Layout and drill the holes in the oil pump mounting plate for the bolts. Mount the oil pump on the plate using the rubber bushings and inserts.

Mount the oil pump plate to the 1 inch round cross tube on the airframe, behind the seat bulkhead on the passenger side, using 1 inch cushion loop clamps. Note the arrow on top of pump indicating direction of flow.

Install hose fittings on the oil pump.

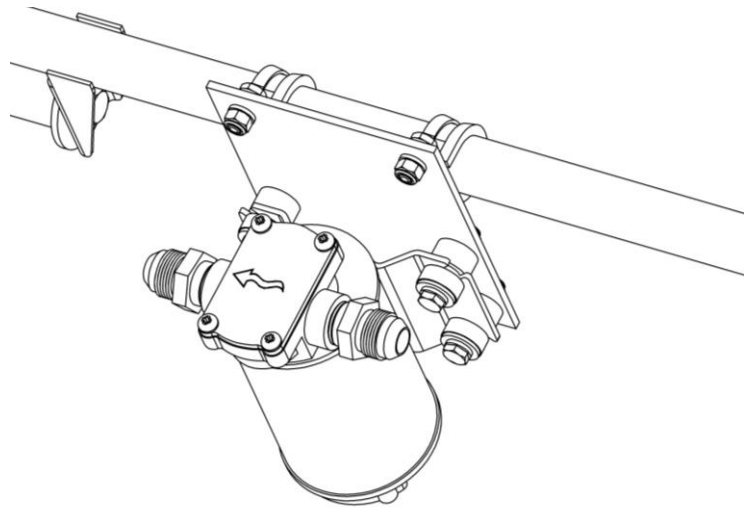


Diagram #14

Complete the wiring to the oil pump.

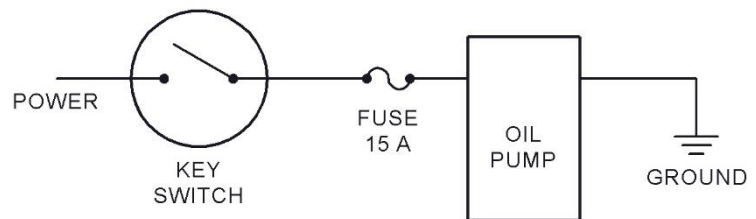
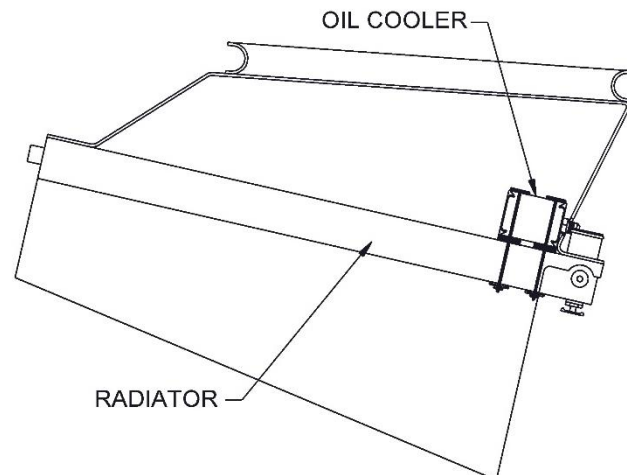


Diagram #15

Install the oil cooler on top of the radiator, inside the fan shroud, centered between the water hoses. Cut holes in the front of the fan shroud for the fittings. Mount the oil cooler to the radiator with four black plastic ties, using foam pads on the ties in between the cooler and radiator. Secure the ties with locking tabs and cut off the excess length.



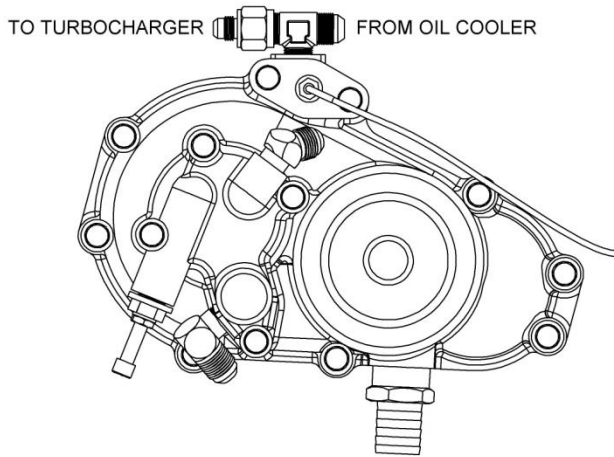


Diagram #16

The 90° fitting on the lower cover of the engine (near the oil temp sender) must be replaced with a tee fitting, if not already done. Install the tee and the -8 to -6 adapter as shown (viewed from below). Use Teflon tape on the NPT threads which screw into the lower cover, but not on the threads where the hoses attach.

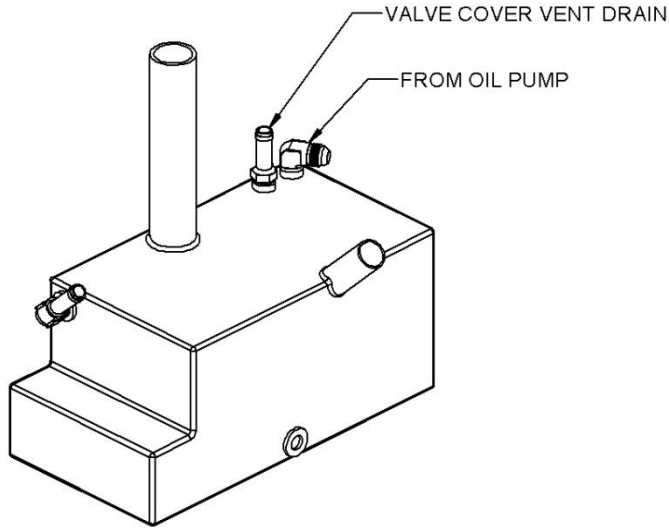


Diagram #17

Remove the brass plugs from the top of the oil sump. Install the 90 degree -8 fitting in one hole, and the straight hose fitting in the other hole. Use Teflon tape on the NPT threads which screw into the sump.



Diagram #18

Remove plugs from the top of the heads and install fittings for the valve cover vent hoses. Route the hoses upward over the fuel tanks. Join hoses with the Tee and route the drain hose to the straight fitting on the top of the oil sump. See next diagram.

Diagram #19

Route the vent hoses upward over the fuel tanks. Join hoses with the Tee and route the drain hose to the straight fitting on the top of the oil sump. Secure all with #6 hose clamps.

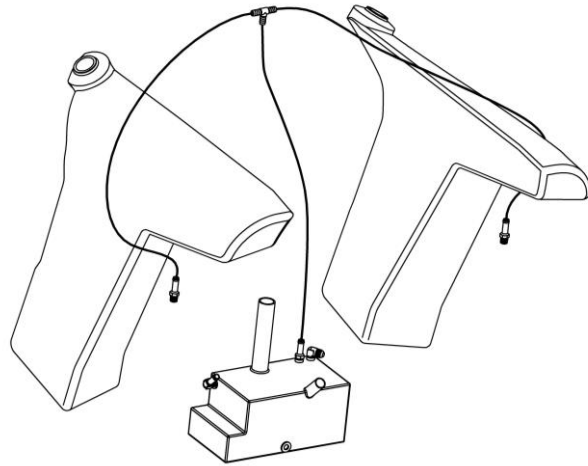


Diagram #20

Install the oil hose from the engine to the turbocharger. Drill a hole in the heat shielding for the hose to pass through. Use a rubber grommet in the hole.

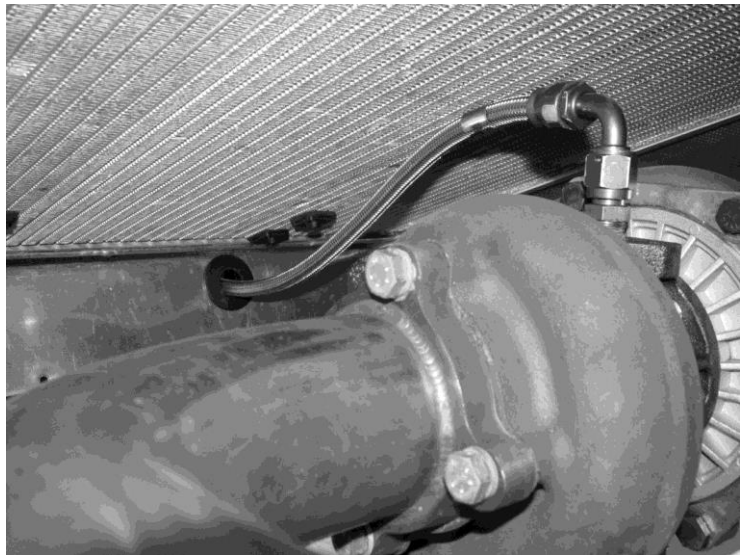
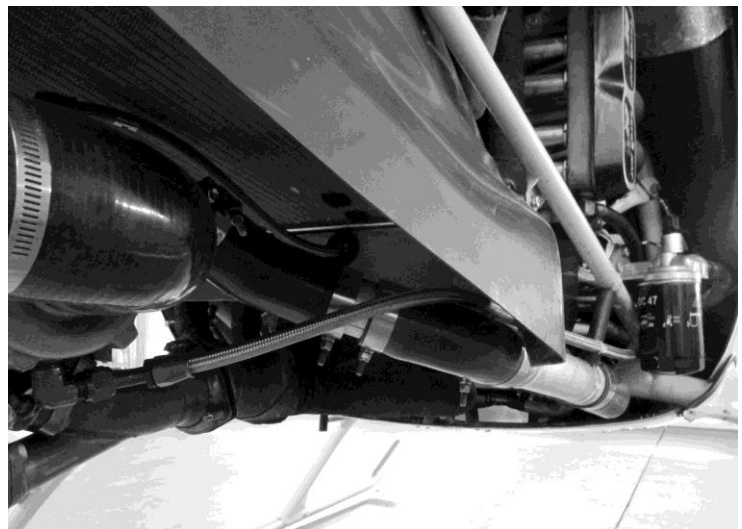


Diagram #21

Install remaining oil hoses and fittings according to the hose routing drawing.

Note: Braided steel hoses should not be allowed to rub against anything else. Cover with rubber hose material where needed to prevent abrasion.



TURBOCHARGER PARTS LIST

PART NO.	DESCRIPTION	QTY.
E48-3000	Turbocharger Assembly	1
E48-5000	Turbo Mount Weldment	1
E48-5060	Rubber Strip	2
E48-5070	Mounting Strap, Steel (1 makes 2)	1
E00-2303	Bolt AN3-6A 3/16 x 3/4	3
E00-2305	Bolt AN3-11A 3/16 x 1-1/8	1
E00-2306	Bolt AN3-12A 3/16 x 1-1/4	4
E00-3301	3/16 Fiberlock Nut AN365-1032A	10
E00-4301	Washer 3/16 Regular AN960-10	22
E00-4302	Washer 3/16 Fender AN970-3	4
E00-2433	Bolt 1/4-20 x 3/4 Drilled Head	2
E00-4401	Washer 1/4 Regular AN960-416	2
E48-5200	Air Filter	1
E48-5100	Turbo Intake Weldment	1
E00-9548	Hose Clamp #48 for 3" Elbow	2
E48-5210	Silicone Elbow 3" x 90 Degree	1
E48-5300	Silicone Elbow 2" x 45 Degree	2
E48-5310	Silicone Elbow 2" x 90 Degree	2
E48-5320	Silicone Reducer 2.75" to 2"	1
E48-5330	Silicone Elbow 2.75" x 180 Degree	1
E00-9590	Hose Clamp for 2" Silicone Tube	9
E00-9591	Hose Clamp for 2.75" Silicone Tube	3
E48-5340	Intake Tube, 2" x 3"	1
E48-5350	Intake Tube, 2" x 5"	1
E48-5360	Intake Tube, 2" x 13"	1
E48-5370	Intake Tube, 2" x 14"	1
E48-5380	Intake Tube, 2.75" x 3"	1
E48-5400	Mounting Bracket	1
E48-5500	Header to Turbo Weldment	1
E00-2330	Bolt AN3-14 3/16 x 1-1/2	3
E00-3303	3/16 Castle Nut AN310-3	3
E24-2151	Spring	3
E00-5000	Cotter Pin 1/16 x 3/4 MS24665-134	3
E00-2906	Bolt M10-1.5 x 40mm Stainless Steel	4
E00-3904	Nut, M10-1.5, Jam, Stainless Steel	4
E00-4911	10mm Split Lockwasher, Stainless Steel	4
E48-5550	Gasket, Exhaust Inlet	1
E48-4000	Wastegate Assembly	1
E48-6300	Vacuum hose, Turbo to Wastegate 16"	1
E00-9170	Hose Clamp -006 for Vacuum hose	2
E00-2904	Bolt M8-1.25 x 25mm SHCS Stainless Steel	4
E00-4910	8mm Split Lockwasher, Stainless Steel	8
E48-5600	Turbo Exhaust Weldment	1
E00-2905	Bolt, M8-1.25 x 25mm Stainless Steel	4
E48-5650	Gasket, Turbo Exhaust	1
E48-5660	Gasket, Wastegate	2
E48-6000	Oil Pump, Turbocharger	1
E28-7220	Adapter AN-8 to 3/8 NPT straight	2
E48-6100	Oil Pump Mounting Plate	1
E48-6110	Rubber Bushing, Oil Pump	4
E00-9115	Clamp, 1" Cushion Loop	2
E00-2301	Bolt AN3-5A (3/16 x 5/8)	2
E28-7210	Adapter AN-8 to 3/8 NPT 90 degree	2
E48-6200	Oil Hose, Engine to Turbo	1
E48-6210	Oil Hose, Turbo to Pump	1

E48-6220.....	Oil Hose, Pump to Sump.....	1
E48-6310.....	Grommet	1
E28-6600.....	Oil Cooler	1
E28-6630.....	Plastic Tie, Oil Cooler Mount	4
E28-6640.....	Foam Pad.....	4
E28-6650.....	Locking Tab.....	4
E28-6700.....	Oil Hose, Oil Filter to Oil Cooler	1
E28-6710.....	Oil Hose, Oil Cooler to Engine	1
E38-6660.....	Fitting, 3/8 NPT to 1/2" Hose Straight.....	3
E48-6230.....	Valve Cover Vent Hose 1/2" x 12' (makes 3).....	1
E48-6240.....	Tee, 1/2" Hose Barb, Brass	1
E48-6250.....	Fitting, 3/8 NPT to -8 90 Degree	1
E38-6450.....	Tee, -8 x 3/8 NPT on side	1
E25-4250.....	Adapter, -8 to -6	1
E00-9006.....	Hose Clamp #6	6
E48-6670.....	Plenum Ring.....	1
A24-1660.....	Main Drive Pulley Assembly, Turbo	1

INTERNAL ENGINE PARTS

A24-1820.....	Connecting Rod, Turbo, Long 5.520.....	4
A24-1005.....	Rod Bearing Set Std.	1
A24-1702.....	Turbo Piston Kit.....	4
A24-6020.....	Piston Ring Set for Turbo.....	4
A24-1720.....	Wrist Pin Spirolock	16
A24-3015.....	Base Gasket, Single Layer Steel	2
A24-4115.....	Gasket, Head, Multi Layer Steel, 4" Bore	2
A24-4204.....	Pushrod Tube Seal	16
A24-4270.....	O-Ring #15 Viton #75A	16
A24-7002.....	Gasket, Intake Manifold	2
E24-9720.....	Gasket, Exhaust Manifold	4
E24-9750.....	NGK Spark Plugs BKR7E	8